Executive Summary

This executive summary provides a brief introduction to the St. Clair River-Lake St. Clair Comprehensive Management Plan for the U.S. watershed, including its authorization by the U.S. Congress, how it was developed, and its scope and level of detail. It includes a summary of each chapter in the document, including recommendations. This executive summary captures the essential content of the document, with a broader discussion and more extensive technical detail provided in the individual chapters.

Key Topics:

- A Call for Action
- Introduction to Lake St. Clair and the St. Clair River
- A Collective Vision
- Chapter summaries and recommendations for actions in the U.S. watershed
- Achieving our Vision

Lake St. Clair: A Call for Action

In the mid-1990s, residents of the Lake St. Clair watershed began to coordinate efforts to address high-profile pollution problems in the lake. These efforts swiftly elevated the lake's profile, both locally and within the Great Lakes region, and there was increasing interest in taking a comprehensive, holistic approach to managing the lake. Some residents perceived Lake St. Clair as the "forgotten lake" since it was being addressed under larger Great Lakes planning programs such as the Lake Erie LaMP, but did not have independent status or a management program specifically dedicated to it. Subsequently, Section 426 of the Water Resource Development Act (WRDA) of 1999 authorized the U.S. Army Corps of Engineers (USACE) to develop a comprehensive management plan for the St. Clair River and Lake St. Clair. The legislation directed the USACE to coordinate efforts with federal, state and local governments and Canadian federal and provincial authorities and to develop a comprehensive management plan that:

- **Identifies** the causes and sources of environmental degradation
- **Addresses** continuous monitoring of biological and chemical contamination
- **Provides** for timely dissemination of contamination levels to public authorities and the public
- **Includes** recommendations for restoration measures

The management plan was developed in collaboration with U.S. federal, state, and local agencies, with input from Canadian federal, provincial, and local agencies, as well as other stakeholders in the Lake St. Clair-St. Clair River watershed. The project was administered through a four-part, binational structure, including a Project Management Team, an Advisory Committee, Technical Workgroups, and a Canadian writing team. Additional binational coordination occurred via the framework established under the Four Agency Letter of Commitment for the Binational Areas of Concern, a 1998 agreement among the U.S. and Canadian federal, state, and provincial governments that outlined roles and responsibilities for restoring the Detroit, St. Clair and St. Marys rivers under the terms of the Great Lakes Water Quality Agreement. In addition to the information in this document, the Canadian federal government will release a separate management plan containing Canadian recommendations for the Canadian portion of the Lake St. Clair watershed.

Project partners agreed that the management plan should:

- **be** a concise, action-oriented document
- **build** upon and elevate existing initiatives without duplicating them
- **adopt** a holistic, ecosystem approach
- **provide** a vision for the lake with guidelines and recommendations to achieve that vision

In developing the management plan, a general consensus emerged that it should be a concise, action-oriented document that builds upon and elevates existing efforts without duplicating them. Project partners agreed that the plan should take a holistic, ecosystem approach and provide a vision for the binational Lake St. Clair community, with guidelines and recommendations to achieve that vision. Finally, the plan should elevate the profile of the lake and watershed within the broader Great Lakes system.

The management plan is intended to augment, but not replace, other planning efforts. As such, the reader should bear in mind several important considerations. First, the St. Clair River has been designated as an international Area of Concern under the provisions of the Great Lakes Water Quality Agreement and Canada is coordinating efforts to develop and implement a Remedial Action Plan (RAP) for the river. A suite of goals and objectives has already been developed for the river under the St. Clair River RAP and corrective actions are being implemented. Therefore, while the river is discussed in this management plan, the plan's goals and objectives pertain *only* to Lake St. Clair. Second, the plan does not currently include Canadian recommendations, which will be developed separately by the Canadian agencies following public consultation. Third, some issues discussed in the plan are binational in orientation and developing recommendations for them will require extended discussions among the responsible U.S. and Canadian federal and state/provincial agencies. Finally, U.S. recommendations are directed toward the U.S. portion of the Lake St. Clair watershed. Many of these will require additional work among responsible agencies at all levels of government to refine them to the point where they are ready for implementation.

The following chapters highlight the strong array of programs, policies and initiatives in place to build upon in implementing the management plan recommendations. While Congressional authorization and funding has not been specifically dedicated to implementing the plan, much can still be accomplished within the context of existing programs. Ultimately, the document's greatest value will be its credibility within the Lake St. Clair community and its ability to secure that community's ownership of it. With credibility and ownership, the document will continue to elevate the lake's profile, both locally and within the broader Great Lakes system, and generate the commitment and resources to implement the plan.

The management plan should be considered a catalyst for action and a foundation for building an effective, long-term management framework that can leverage and focus existing efforts, while securing the new resources needed to restore and protect the Lake St. Clair watershed.

Key Topics:

1) History and settlement
2) Resources in the watershed
3) Uses of the watershed
4) Impacts to the watershed
5) Resource management

Chapter 1:

Introduction to Lake St. Clair and the St. Clair River

The quality of Lake St. Clair and the St. Clair River is influenced by a wide array of factors, including the physical and biological characteristics of the resources, human uses of the watershed, contaminants and impacts to the system, and institutional arrangements that manage the resources and seek to prevent or minimize negative impacts to the system. This chapter provides an overview of these diverse aspects of the Lake St. Clair-St. Clair River watershed.

Lake St. Clair and the St. Clair River are vital binational resources that provide a wide array of benefits to the nearly six million U.S. and Canadian residents who live in the

watershed. With uses ranging from fishing to recreational boating, drinking water to commercial navigation, the lake and river are defining natural features of southeast Michigan and southwest Ontario.

They also are vital parts of the larger Great Lakes system. The lake and river are key connections between the upper and lower Great Lakes, both for commercial navigation as well as fish and wildlife that reside in or pass through the area. The St. Clair River-Lake St. Clair-Detroit River corridor is also the outlet for the three upper Great Lakes, with more than 90 percent of the average annual water supply to Lake Erie and nearly 75 percent of the supply to Lake Ontario passing through the corridor.

Human uses of Lake St. Clair and the St. Clair River have dramatically altered the natural processes of the system. Coastal wetlands have been drained and filled, the shoreline hardened, and a 27-foot-deep navigation channel dug through the middle of the lake (which has an average natural depth of about 12 feet). The vast majority of the watershed's original landscape has been replaced by residential, commercial and agricultural development.

Pollutants from industry, as well as day-to-day human activities have contributed to impairment of the water quality in the lake and river. Fish and wildlife communities have been impacted by loss of habitat, recreational activities, and the introduction of invasive species – including desirable species such as coho salmon and unwanted invasive species such as the zebra mussel (which was first detected in Lake St. Clair).

While human impacts on the Lake St. Clair watershed have been immense, efforts over the past three decades to mitigate those impacts have been substantial.

While human impacts to the Lake St. Clair watershed have been immense, efforts over the past three decades to mitigate those impacts have also been substantial. A wide array of laws, regulations and pollution prevention activities has dramatically reduced the impact of human activities on water quality. Other programs have safeguarded public water supplies and protected public health.

One of the greatest challenges in effectively managing the future of Lake St. Clair and the St. Clair River will be to manage this complex institutional setting and facilitate an efficient, credible and focused program for balancing our continued ability to benefit from the resources while preserving their chemical, physical and biological integrity for current and future generations.

Chapter 2:

A Vision for Lake St. Clair and the St. Clair River

This chapter defines the vision, principles, goals, and objectives of the St. Clair River-Lake St. Clair Comprehensive Management Plan. They provide a foundation and a series of benchmarks upon which to both guide implementation of the management and evaluate its success. Appendix A of the management plan contains a matrix that illustrates the linkages between the management plan goals, objectives, and recommendations.

Our Collective Vision

We envision a healthy Lake St. Clair watershed in which governments, associations, businesses, educational institutions, and individuals work

together to protect, restore, and maintain the health of the watershed for current and future generations.

Principles to Guide Our Efforts

Individual Rights and Responsibilities

Access to clean water, air, and land is a fundamental right of all individuals. This right involves a shared responsibility for the informed use, management, conservation, and protection of these natural resources.

Government Rights and Responsibilities

Government authorities have an obligation to protect, restore, and maintain resources that are held in public trust and to support implementation of relevant federal, state, provincial and local laws and programs consistent with their mandates.

Environmental Quality

A healthy Lake St. Clair watershed requires protecting, restoring, and maintaining the natural resources of the watershed through improved management, monitoring, and research.

Economic Prosperity

A healthy Lake St. Clair watershed requires an appropriate balance between ecosystem protection and economic development.

Partnership Approach

A healthy Lake St. Clair watershed requires cooperative management among governments, associations, businesses, educational institutions, and individuals in the watershed.

Ecosystem Approach

A healthy Lake St. Clair watershed requires an ecosystem approach that considers Lake St. Clair and its entire drainage basin as a holistically interconnected system. Each component of the system, including humans, affects other parts of the system.

Sustainable Communities

Sustainable communities meet the needs of the present generation without compromising the ability of future generations to meet their own needs.

Goals and Objectives

This plan identifies goals and objectives to protect and restore the Lake St. Clair watershed. These address only Lake St. Clair, as a separate suite of goals and objectives has already been developed for the St. Clair River as part of its international

RAP. They are consistent with, and complementary of, those in place for the St. Clair River. The following are the major goals for Lake St. Clair; the associated objectives are provided in Chapter 2.

Environmental Health of the Watershed

Goal: Pollution does not threaten public health and the health of the watershed.

Habitat and Biodiversity

Goal: All biological communities and habitats are healthy, diverse, and self-sustaining.

Human Health

Goal: Water is safe for drinking.

Goal: Water is safe for swimming.

Goal: Fish and wildlife are safe to consume.

Land Use

Goal: Land use activities are sustainable and support a healthy watershed.

Fisheries, Recreational Boating and Commercial Navigation

Goal: Recreation and economic activities impacting the lake are sustainable and support a healthy watershed.

Monitoring

Goal: Data and information are available to ensure informed management decisions.

Achieving Our Vision

Goal: All entities responsible for natural resources and environmental protection within the watershed are working together in a collaborative manner to protect and enhance the watershed.

Goal: The public is informed about environmental issues and engaged in activities to restore and protect the lake.

Chapter 3:

Environmental Health of the Watershed

Key Topics:

1) Point source discharges
2) Nonpoint source pollution
3) Findings and recommendations

This chapter provides an overview of the major causes and sources of pollution in the watershed, identifies the extent to which these are a problem, and describes the impacts on the environment and human health.

Many contaminants have the potential to threaten the quality of the environment and human health in the Lake St. Clair watershed. These contaminants come from a variety of past and present agricultural, industrial, private, and municipal activities, and include both point and nonpoint sources of pollution. Point source contamination is pollution that comes from an easily identifiable source, such as outfall pipes from industrial or municipal wastewater treatment plants. Nonpoint source pollution comes from indistinguishable or hidden sources, such as failing septic systems, leaking underground storage tanks, atmospheric deposition, and runoff from lawns, agricultural fields, parking lots and roadways.

Industrial and municipal point sources are generally well regulated and are no longer the largest threat to the St. Clair River and Lake St. Clair ecosystem. However, accidental as well as illegal industrial/municipal releases, including discharges of untreated sewage during major weather events due to system overload, still occur. State and federal agencies with enforcement authority must be adequately funded to continue administering regulatory investigative and enforcement programs to maintain effectiveness . Municipal stormwater remains a large pollutant source that has been traditionally unregulated. Programs are being implemented in both the United States and Canada to remedy this shortcoming. Once again, adequate funding will be critical to ensure consistent and effective long-term enforcement and implementation of these programs.

Wastewater treatment in rural and developing areas remains a challenge. Onsite sewage disposal systems are regulated, but lack of consistent monitoring after installation and lack of proper use and maintenance have resulted in large numbers of reported failures. Failure to properly operate small treatment plants and sewage lagoons remains a concern of public health officials, particularly in developing areas.

Point source discharges to the St. Clair River, Lake St. Clair, and their tributaries come from municipal and industrial sites, sewer overflows, municipal stormwater, and illicit discharges.

Combined sewer overflows (CSOs) are being addressed on both sides of the river. Much corrective action has been completed and additional mitigation efforts are scheduled. For the most part, untreated CSOs are being eliminated. Sanitary sewer overflows (SSOs) continue to be discovered as communities gain a better understanding of their infrastructure. Discharges from SSOs represent a serious health hazard and programs to identify and eliminate them must continue.

Point source discharges to the St. Clair River, Lake St. Clair, and their tributaries come from municipal and industrial sites, combined and sanitary sewer overflows, municipal stormwater, and illicit discharges. Illicit discharges are difficult to identify. Illicit Discharge Elimination Programs in Michigan must be continued and strengthened.

Nonpoint source discharges remain a challenge due to difficulties in identifying the scope and sources of the problem, and developing and enforcing solutions to address it. Efforts in both countries to manage the resource on a watershed basis are a crucial first step.

Nonpoint source discharges come from agricultural runoff, waste disposal sites, fertilizers and pesticides, erosion and sedimentation, contaminated groundwater and sediments, spills, and airborne deposition.

Agriculture utilizes much of the land in the Ontario portion of the watershed, as well as a significant portion of the tributary land in St. Clair County, Michigan. Agricultural impacts in the U.S. portion of the watershed tend to be localized. Voluntary programs have been an effective tool to educate the agricultural community on water quality impacts and mitigation strategies. However, more oversight and enforcement is needed in some areas. In Ontario, spills and other discharges due to manure mismanagement degrade water quality and impact fish and fish habitat through oxygen depletion, toxic levels of ammonia, and nutrient enrichment leading to excessive plant growth and further disruption of the oxygen regime. Soil erosion is also a problem and is the highest single contributor of phosphorus to the watercourses. Implementation programs to reduce livestock access to watercourses, correct pollution sources and improve local water quality are in place to address these problems.

Environmental Health of the Watershed
Candidate Management Plan Recommendations for Actions in the U.S. Watershed:

Contaminant Sources and Contaminated Sediments

3-1. Develop and implement a Contaminant Management Strategy that focuses on pollution prevention and restoration of polluted areas.

3-2. Implement U.S. obligations under the Great Lakes Binational Toxics Strategy

3-3. Prioritize contaminants of concern.

3-4. Identify all sources and quantify all loads of point source and nonpoint source contaminants

3-5. Investigate and document, where necessary, water and sediment quality to establish baseline conditions

3-6. Investigate the extent of contaminated sediments

3-7. Develop, fund and distribute practical and economically feasible pollution prevention programs for municipalities, industries, and other relevant parties

3-8. Continue and accelerate research and monitoring on the distribution, fate, and effects of mercury, PCBs and other contaminants

3-9. Define impacts of new generation pesticides, pharmaceuticals, endocrine disrupters, and other chemicals

Pollution Prevention Practices and Education

3-10. Identify, quantify and prioritize atmospheric sources of contaminants and implement enforcement procedures to assure that the sources are reduced or eliminated

3-11. Distribute to local government and other stakeholders information-education materials highlighting homeowner impacts on water quality and actions that can be taken to prevent or minimize those impacts

Key Issues:

1) Loss and degradation of habitat
2) Protection of fish and wildlife habitat
3) Invasive species
4) Pollution prevention and control
5) Impacts from boating and shipping
6) Lake levels

Chapter 4:

Habitat and Biodiversity

This chapter provides an overview of the habitat and wildlife found in the Lake St. Clair and St. Clair River region and reviews key threats and impairments to the region's habitat and biodiversity.

Over the last 150 years the Lake St. Clair region has undergone a dramatic transformation from open space and wetlands to agriculture and urban development, which now dominate the landscape. This conversion has resulted in drained wetlands, loss of tallgrass prairie, fragmented forest habitats, increased sedimentation, excess nutrient loading and dredged aquatic habitats. Lake St. Clair's original shoreline has been altered significantly during the last century, resulting in decreased populations of fish and wildlife, especially species that require undisturbed shoreline for critical portions of their life cycle.

Changes to the Lake St. Clair ecosystem to accommodate agricultural, residential, municipal, industrial, commercial, recreational and commercial shipping activities, along with introductions of invasive species, have lead to declines in habitat quality and native species distribution and abundance. Today, the shoreline of the St. Clair system displays sharply contrasting land uses. Portions of the Upper St. Clair River are heavily industrialized. On the Canadian side, between Sarnia and Corunna, Ontario, oil and chemical companies occupy much of the river shoreline. In Michigan, industrialization of the shoreline is mainly centered at Port Huron. Along the Ontario shoreline of Lake St. Clair, wetlands and agriculture dominate, whereas in Michigan the entire shoreline is highly urbanized.

Changes to the Lake St. Clair ecosystem to accommodate agricultural, residential, municipal, industrial, commercial, recreational and shipping activities, along with introductions of invasive species, have lead to declines in habitat quality and native species distribution and abundance.

Minimizing the ongoing pattern of loss, minimizing stresses leading to impairment, as well as restoring lost habitat are approaches to managing the system habitat resource. Conservation actions aimed at protecting Lake St. Clair must target key sources of stress. Early efforts should focus on protecting habitats that are most important to the lake's ecosystem, i.e. coastal and delta wetlands.

Coordination and cooperation among resource agencies and organizations should continue to ensure continued success of fish and wildlife management programs that benefit both game and nongame species. Management practices must be responsive to emerging issues, as well as to current threats to fish and wildlife species, including habitat loss, invasive species, contaminants, and conflicting uses. More information is required to assess the status of rare, threatened, and endangered flora and fauna and their habitats, which are being impacted by habitat loss, invasive species and other factors.

Finally, continued action is needed to prevent new introductions of invasive species into the Great Lakes, and to prevent the spread of those already present. Many experts consider invasive species to be among the most serious threats to biodiversity in the Great Lakes. Because established invasive organisms are virtually impossible to eradicate, the most effective strategies are those that prevent introductions from occurring in the first place. Such efforts are underway at the state/provincial and federal levels. These efforts could benefit from local Lake St. Clair stakeholder support.

Habitat & Biodiversity
Candidate Management Plan Recommendations for Actions in the U.S. Watershed:

Loss and Degradation of Habitat

4-1. Develop a habitat strategy to restore and maintain natural physical and biological diversity and identify priority habitat areas for restoration and conservation. The strategy should:

4-1.a. Provide a single coordinated inventory of wetlands and other habitats that identifies protected and managed habitats as well as rare and environmentally sensitive habits

4-1.b. Locate, inventory and map imperiled species

4-1.c. Restore degraded priority habitat areas by working with landowners and public land managers to promote beneficial land management practices and natural community restoration practices

4-1.d. Coordinate land acquisition programs with existing federal, state, provincial, and local habitat protection programs

4-1.e. Develop a public outreach program to increase interest in, and awareness of, habitat restoration and conservation. Develop outreach tools that outline habitat conservation and restoration programs available through government agencies and conservation organizations

4-1.f. Develop a public education program that focuses on the unique habitat within the watershed and methods to protect it

4-1.g. Encourage local units of government to preserve and protect unique habitat areas and to restrict development in environmentally sensitive areas. Provide technical assistance to local units of government to manage local habitat areas

4-2. Use the findings of the Lake St. Clair Coastal Habitat Restoration and Conservation Plan to contribute to a Lake St. Clair habitat strategy

Invasive Species

4-3 Prevent and control the introduction of aquatic invasive species into the Great Lakes-St. Lawrence system

4-4. Support the implementation of Michigan's Aquatic Nuisance Species State Management Plan Update

4-5. Develop and distribute educational information regarding identification and control of invasive species

Impacts from Boating and Shipping

4-6. Limit watercraft access to environmentally sensitive areas during certain seasons of the year to protect waterfowl nesting and fish spawning

4-7. Develop a focused public education program to promote understanding and protection of the lake by watercraft users

4-7.a. Disseminate public information materials to registered watercraft owners in the region

4-7.b. Post signage at boat launches and piers on the importance of protecting Lake St. Clair resources

4-7.c. Educate boaters about aquatic vegetation and its important ecological role in the lake, and the need to avoid damage to it by boating and related activities

Key issues:

1) Drinking water protection
2) Fish consumption advisories
3) Beach closures
4) Beach monitoring and assessment
5) Spill prevention and control

Lake St. Clair and the St. Clair River provide a safe supply of drinking water to millions of residents and are among the most heavily used recreational areas in the Great Lakes for fishing, boating and swimming.

Chapter 5:

Human Health

This chapter provides information on human health concerns in the watershed, identifies key issues, and reviews important programs and initiatives in place to address these issues.

Lake St. Clair and the St. Clair River provide a safe supply of drinking water to millions of residents in Michigan and Ontario, and are among the most heavily used recreational areas in the Great Lakes for fishing, boating and swimming. Many people on both sides of the U.S.-Canadian border are concerned about the potential health risks associated with pollutants in these water bodies. These concerns are underscored by beach closures and fish consumption advisories, as well as potential threats to drinking water. The causes for these public health concerns vary, but citizen response is unified: people want full use of local water resources without risks to their health.

The pollutants that raise public health concerns can be broadly divided into two categories: long-term persistent chemicals and disease-causing bacteria. These pollutants can threaten human health if people drink contaminated water, eat contaminated fish or swim in contaminated water.

Drinking water from the St. Clair River and Lake St. Clair is safe but potentially vulnerable to bioaccumulative contaminants, chemicals from agricultural runoff, and emerging issues related to microbial and chemical contaminants. There are potential problems with contamination due to pollution from various point and nonpoint sources, which can be exacerbated by the weather. The lake and its watershed must continue to be protected to ensure a continued safe source of drinking water.

Due to stronger regulations and cleanup efforts, substantial progress has been made in eliminating or reducing chemicals that lead to fish consumption advisories, and monitoring results throughout the watershed indicate a trend toward declining levels of fish contamination. However, local, regional and global contamination sources continue to contribute to the restrictions, and fish consumption advisories will remain in effect until persistent toxic chemicals in fish are reduced to levels considered safe for public health.

Beach closures due to elevated bacteria levels continue throughout the watershed. There are many sources of bacteria within the watershed, including illicit discharges from failing on-site disposal systems, CSOs, and SSOs. Correcting the beach closure problem will require that these sources be either treated or eliminated.

Substantial progress has been made to reduce and eliminate the amount of pollutants in the watershed. Efforts must continue to address a wide variety of pollution sources and to identify new or emerging issues that have the potential to impact human health.

Human Health
Candidate Management Plan Recommendations for Actions In the U.S. Watershed:

Drinking water protection

5-1. Complete and implement Source Water Assessments to ensure effective protection of raw drinking water supply sources

5-2. Require monitoring programs for public water supplies to assure rapid detection of variations in water quality due to spills, contamination, and other factors

5-3. Revise existing notification and response plans to assure source water protection from contaminants associated with spills and runoff events

5-4. Support long-term establishment and operation of the Lake St. Clair weather buoy.

Spill prevention and control

5-5. Formalize the current, informal reporting and notification process used by water treatment operators

Fish consumption advisories

5-6. Continue to collect and evaluate fish contaminant monitoring data and expand efforts to disseminate this information to the public

5-7 Review sediment and water quality criteria and sediment remediation/mitigation measures to assure that the bioavailability of bioaccumulative chemicals of concern are reduced to the point that fish consumption guidelines are no longer necessary.

5-8. Expand ongoing outreach efforts to adequately inform the public, especially at-risk populations, about fish consumption guidelines

Beach closures

5-9. Require the elimination of all sources of untreated human sewage entering the waterways through

5-9.a. The development and implementation of illicit discharge elimination plans (IDEP)

5-9.b. Completion of combined sewer overflow (CSO) and sanitary sewer overflow (SSO) treatment and elimination programs

5-9.c. Detection and correction of failing on-site disposal systems (OSDSs)

5-9-d. Implement point-of-sale OSDS inspection programs to assure continued maintenance

5-10. Improve wastewater treatment planning, monitoring and permitting at the local level to assure that sewage is properly managed, regardless of the selected treatment alternative. Specifically, smaller systems must be properly sited, constructed, monitored, operated, maintained, and regulated. This would require:

5-10.a. Existing programs for permitting and siting on-site sewage disposal systems must be diligently enforced

5-10.b. Existing small package wastewater treatment plants and lagoon systems must be well monitored by state and local environmental officials

5-10.c. An active E. coli monitoring program for drains and tributaries must be maintained

5-10.d. Provide incentives for septage transfer stations and disposal facilities

5-11. Develop and implement an education and incentive program to assist local units of government in providing regional sewer service that would minimize the number of small local wastewater treatment plants, lagoons and onsite disposal systems

5-12 Evaluate the impact of wildlife, pets, and livestock on elevated *E coli* levels. Institute a regional bacterial source tracking system (BST)

Beach Monitoring and Assessment

5-13. Continue research into more timely and cost effective strategies for early detection of beach closures and predictive models for beach closures

5-14. Implement the Beaches Environmental Assessment and Coastal Health Act (BEACH Act)

Chapter 6:

Land Use

Key Issues:

1) Land use planning
2) Nonpoint source pollution
3) Stormwater runoff

This chapter reviews current patterns of land use in the Lake St. Clair watershed and summarizes past, present, and future land use issues affecting the St. Clair River and Lake St. Clair.

Land use has a direct and major impact on the environmental quality of the Lake St. Clair watershed. Increased impervious surfaces in urban areas and loss of natural vegetation associated with land use changes adversely affect surface water quality and quantity by increasing runoff and associated contaminants. The loss of natural habitat associated with land use change has critically impacted the biodiversity and ecosystems in the watershed. Programs are needed to help mitigate these impacts and to manage growth in the region.

Managing growth and land development is a key issue for Southeast Michigan. In Ontario, the watershed is primarily rural and is impacted mostly by agricultural development with some urban development.

Managing growth and land development is a key issue for southeast Michigan. Local units of government within the watershed should incorporate the preservation, protection, and enhancement of the area's habitat and ecological and economic integrity into their comprehensive land use plans. Nonpoint source pollution and stormwater problems are worsened by increased residential and commercial development. Nonpoint source pollution controls and stormwater best management practices are needed to limit the harmful affects of this pollution.

In Ontario, the heavily concentrated industrial and residential development along the upper portion of the St. Clair River produced water quality and sediment problems that have been the focus of the St. Clair River Remedial Action Plan. The largely rural Lake St. Clair watershed is impacted mostly by agricultural development with some urban development.

In spite of stresses caused by historic and present conflicting land and water uses, Lake St. Clair and the St. Clair River continue to be viable environmental and economic assets and important recreational resources.

In spite of stresses caused by historic and present conflicting land and water uses, Lake St. Clair and the St. Clair River continue to be viable environmental and economic assets, and important recreational resources. Typically, more walleye, bass, muskellunge, and sunfish are harvested from Lake St. Clair each year than from any of the other Great Lakes, and the region claims the greatest concentration of registered boats in Michigan. Because of these benefits, water quality management efforts should incorporate sustainable land use principals and best management practices for existing developments as well as areas of future development.

Land Use
Candidate Management Plan Recommendations for Actions In the U.S. Watershed:

Land Use Planning

6.1 Maintain, on a county and regional level, land use data and information. This should include maps that depict the location of coastal areas, protected and managed areas, and natural features that identify at-risk areas for better protection and management

6.2 Develop and implement regional and local watershed management plans to control, mitigate, and prevent point source and nonpoint source pollution

6.3 Provide technical assistance to local units of government to manage development and natural resources in a sustainable manner through the use of education, incentives, technical assistance, and funding assistance

6.3.a. Increase funds and technical assistance for local government to develop and implement land use plans. Emphasize erosion hazards, floodplain functions, sedimentation controls, habitat protection, and use of natural vegetation as requirements in local zoning and subdivision regulations

6.3.b. Increase funds and technical resources for local units of governments to implement best management practices (BMPs) to protect natural resources, reduce erosion, and reduce nonpoint source pollution

6.3.c. Educate local zoning boards and planning commissions regarding innovative tools to manage development and natural resources in a sustainable manner, such as model ordinances, best management practices, and existing programs that provide technical and cost-share assistance to control and prevent point and nonpoint source pollution

6.3.d. Encourage local zoning boards and planning commissions to establish regulations to limit development in sensitive areas, such as critical habitats and erosion sites

6.3.e. Encourage local zoning boards and planning commissions to incorporate a review of water quality impacts in all projects they review and to deny approval to projects that would significantly degrade water quality or contribute to violations of water quality standards

6.4. Require local units of governments to permit the use of Low Impact Development (LID) in all new development and redevelopment

6.5. Minimize traditional techniques of shoreline hardening and encourage alternative approaches that improve fish and wildlife production capacity through habitat protection and restoration

Nonpoint Source Pollution

6.6. Accelerate implementation of existing incentive programs to reduce nonpoint source pollution

6.7. Require the use of advanced best management practices through the use of improved post-construction stormwater control measures that limit post-development flow rates to predevelopment levels

6.8. Evaluate soil erosion and sedimentation control programs for adequate staffing and enforcement

6.9. Identify and target priority areas for soil erosion and sediment control efforts.

6.10 Educate property owners, such as homeowners and farmers, about nonpoint source pollution and encourage them to implement actions to minimize the amount of nonpoint source pollution leaving their property

Stormwater Runoff

6-11. Enforce the requirements of the Michigan General Stormwater Permit and the U.S. EPA Phase II stormwater permit

6-12. Develop and implement Storm Water Pollution Prevention Initiatives (SWPPIs) in all governmental units in the watershed, including implementation of pollution prevention and good housekeeping practices.

6-13. Implement BMPs designed to minimize impacts of new development and redevelopment.

6-14. Incorporate findings from the watershed planning efforts into future land use planning to improve stormwater management

6.15 Adopt improved local ordinances, consistent Master Planning, and coordinated zoning

6.15.a. Require infiltration, buffer strips, and other BMPs in developments

6.15.b. Promote innovative site design that reduces the creation of impervious surfaces

6.15.c. Emphasize stormwater management as requirements in local zoning and subdivision regulations

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Chapter 7:

Fisheries, Recreational Boating and Commercial Navigation

Key issues:

1) Pollution prevention from marine industries
2) Fish and wildlife habitat protection
3) Dredging
4) Lake levels

This chapter provides information about fisheries, recreational boating, and commercial navigation in the region, and summarizes the benefits these uses provide, as well as their impacts to the lake and river.

The Lake St. Clair watershed provides some of the best opportunities for boating, fishing, diving, and swimming in the Great Lakes. Recreational fishing and boating and commercial navigation on these waterways contribute significantly to the economy of Southeast Michigan and southern Ontario.

Lake St. Clair continues to support a valuable fish community and fishery in spite of significant loss of valuable wetland habitat and colonization by invasive species. It supports a large recreational fishery for walleye, yellow perch, smallmouth bass, and muskellunge. Within the Walpole Island First Nation community, many families depend on the fish they catch for subsistence.

The excellent fishing, relatively clean and protected water, interesting islands and bays, accessible boating facilities, and proximity to major urban areas has made Lake St. Clair one of the major recreational boating centers in the United States. Based on conservative estimates, boaters on Lake St. Clair contribute more than $249 million a

year to the economy of Macomb, Wayne, and St. Clair Counties, Michigan. The recreational opportunities of the lake are tied to the health of the lake's ecosystem.

The availability of reliable water transportation is what attracted European settlement to the region. Today, much of the Great Lakes' local economy still relies on commercial shipping to move products such as petroleum and grain to other parts of the Great Lakes and the world, with between 4,000 to 5,000 commercial vessel transits each year. The alteration of the lake and river to accommodate these ships has resulted in irreversible damage to the ecosystem.

Environmental impacts, such as increased access to environmentally sensitive areas, shoreline hardening, pollution, navigational channel construction and operation, and the introduction of invasive species, have negatively impacted water quality and permanently altered the habitat and biodiversity of the system. Concerns associated with fisheries management in Lake St. Clair include loss of wetland and other habitats and native fish populations; impacts of harmful invasive species; chemical contaminants in the system; and user conflicts and impacts of boats on sensitive habitats. Maintaining and enhancing habitat without impairing this resource for the enjoyment and use by future generations is a major challenge.

Fisheries, Recreational Boating and Commercial Navigation Candidate Management Plan Recommendations for Actions in the U.S. Watershed:

Pollution prevention from marine industries

7-1. Develop and implement pollution prevention programs for marine industries and recreational activities

- *7-1.a. Expand pollution prevention programs to target boat maintenance and repair facilities in all counties bordering Lake St. Clair*
- *7-1.b. Support implementation of a Clean Marina Program to educate marina operators about best management practices in order to avoid pollution releases to the environment and encourage implementation of these BMPs*

7-2. Assure compliance with existing rules and regulations for watercraft users

7-3. Increase the number of pump-out stations in the watershed to accommodate increasing boater demand

Fisheries Management

7-4. Fulfill obligations under the Great Lakes Fishery Commission's *Fish Community Goals and Objectives for Lake St. Clair and Connecting Waters (St. Clair System)*

Dredging

7-5. Support efforts of the Great Lakes Dredging Team to develop risk-based guidance to establish contamination thresholds for different beneficial use applications of dredged material, based on the physical and chemical properties and end uses

7-6 Ensure that all dredging is conducted in an environmentally sound manner to minimize downstream impacts

Aquatic Invasive Species and Ballast Water Management

7-7. Prevent the introduction of aquatic invasive species from ballast water and other commercial vectors throughout the Great Lakes-St. Lawrence system

7-8 Evaluate and recommend ballast water management practices and treatment technologies

7-9 Disseminate educational materials to prevent and limit the spread of aquatic nuisance species by recreational boaters, fishermen, and riparian property owners

Public Access

7-10. Provide adequate public access to Lake St. Clair by means of environmentally sound marinas, boat launches, and related facilities

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Chapter 8:

Monitoring

Key topics:

1) Monitoring purposes
2) Canadian monitoring programs
3) U.S. monitoring programs and recommendations
4) Summary and conclusions

This chapter summarizes existing monitoring programs that are in place or have been completed in the past and provides recommendations for coordinating monitoring efforts in the watershed.

Monitoring programs and scientific studies are established to generate, collect and analyze information to support established programs or policies of governmental or nongovernmental organizations. The review of monitoring programs and scientific studies in this chapter demonstrate that the St. Clair River and Lake St. Clair have been, and continue to be, the subject of substantial efforts from government agencies, industry, the scientific community, and concern citizens.

A large number of organizations currently perform some type of monitoring in the Lake St. Clair watershed and much data has been collected. However, little effort has been focused on reviewing collected data across disciplines and integrating the information relative to local, state, and national priorities. In addition, different groups have promoted monitoring systems or programs as necessary to address and solve Lake St. Clair problems. However, while such systems or programs may be necessary to collect data to react to a specific problem, lake management requires a less piecemeal and more integrated approach to monitoring.

The challenge now lies in linking monitoring, including programs as well as techniques, across jurisdictions and disciplines at the watershed scale. To do this effectively, a monitoring strategy and structure to coordinate, collaborate and prioritize these efforts are necessary along with the development of monitoring indicators to provide a way to evaluate and track progress and effectiveness.

As a first step in this direction, the USACE, in partnership with the Macomb-St. Clair Inter-County Advisory Group and in collaboration with local, State and Federal agencies, environmental organizations and academia, compiled a web-based monitoring inventory, monitoring needs assessment and developed a gap analysis and monitoring strategic plan for the U.S. side of Lake St. Clair watershed. Since the Lake St. Clair watershed is binational, a similar Canadian effort would be necessary, then integration of both plans.

Once the baseline monitoring information and needs are available for the entire basin, a structure to coordinate and collaborate is developed, and U.S. monitoring coordination group formed, the development of a regional monitoring plan can be initiated. Accomplishing this task requires binational involvement, prioritization of monitoring needs, and an in-depth analysis of current monitoring efforts and collected data across disciplines and as related to regional and cross-jurisdictional watershed monitoring needs.

On the U.S. side, a U.S. monitoring coordination committee, ideally, would drive the collaboration and coordination needed to link monitoring across jurisdictions and disciplines within the U.S. portion of the watershed and promote data comparability, enhance data utility through development of data collection and analysis standards, extend resources and deliver efficient and timely reporting on environmental change and progress. It would be important for this group to interface with the Monitoring Upper Great Lakes Connecting Channels (MUGLCC) committee to ensure national and binational water quality goals and needs are considered within the watershed and the upper Great Lakes Connecting Channel System.

Many organizations have been set up across the country to address monitoring and could serve as a starting point to establishing a U.S. monitoring committee and structure for guiding monitoring in support of the management of the St. Clair River and Lake St. Clair. However, absent directed leadership, funding, or authorization, the most feasible approach at this time may be to allow for the evolution of such a monitoring body, rather than imposing an organizational structure, by the self-organization of a committee at the grass roots level based on representation from monitoring agencies and academia in the region.

Monitoring
Candidate Management Plan Recommendations for Actions In the U.S. Watershed:

8-1. Create a U.S. monitoring coordination committee to develop and implement a comprehensive, coordinated, long-term monitoring strategy for the U.S. portion of the Lake St. Clair watershed. The main objectives of the committee should be to:

- *8-1.a. Establish a priority list of detailed monitoring needs in the watershed*
- *8-1.b. Encourage the sharing of data and information among all interested U.S., Canadian, and tribal/First Nation authorities*
- *8-1.c. Coordinate monitoring among monitoring organizations toward basinwide needs*
- *8-1.d. Direct future regional monitoring in a way that best meets basinwide monitoring needs*
- *8-1.e. Coordinate with existing binational monitoring efforts, such as the Monitoring Upper Great Lakes Connecting Channels (MUGLCC) committee*
- *8-1.f. Address additional management plan monitoring recommendations (listed below)*

8-2. Align program objectives to address priority monitoring needs and allow for an effective merger of information between disparate programs. Programs with conflicting or overlapping

goals or objectives should be examined for areas of compromise or adaptation to better accommodate basinwide goals

8-3. Develop a set of critical indicators and identify parameters needed to produce monitoring results for these indicators

8-4. Develop standards for data collection methods, metadata creation, quality assurance and quality control (QA/QC) plans, data analysis comparability, and report generation

8-5. Identify sampling locations that are representative of the system being sampled and expand monitoring into key areas where currently none exists

8-6. Coordinate sampling frequency among monitoring programs so that the combined network addresses basinwide-monitoring needs

8-7 Ensure that the combined network of monitoring programs results in a sampling design that is statistically powerful enough to detect change in the ecosystem

8-8. Analyze methodologies being used by monitoring organizations to ensure they produce comparable data.

8-9. Where possible, utilize remotely sensed data and modeling approaches to fill in data gaps, better connect monitoring information with management activities, and develop a better understanding of ecosystem interactions.

8-10. Maintain the publicly accessible inventory of current monitoring programs

8-11. Establish a financial plan for supporting monitoring coordination committee staff and addressing monitoring gaps

8-12. Utilize emerging technologies to develop a real-time monitoring system within the watershed for appropriate parameters, especially those related to human health and drinking water protection

8-13. Create a periodic environmental report card for the U.S. portion of the Lake St. Clair watershed that reports on status and trends in environmental indicators, the overall health of the watershed, and progress toward achieving management plan goals and objectives

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Chapter 9:

Achieving Our Vision

This chapter discusses the challenge of implementing the management plan, outlines a recently adopted binational framework for managing Lake St. Clair from Federal, State and binational perspective, suggests steps for refining and "operationalizing" plan recommendations, and provides recommendations for initiating the implementation process.

With completion of the management plan, the challenge is implementation. In the United States, the institutional framework for managing water quality is complex. Many agencies at different governmental levels, and many programs within

agencies, have some responsibility related to water quality. In this regard no single agency has sole power and authority to manage the lake, or for that matter, to implement, in total, the management plan recommendations. In addition, differing levels of government have varying perspectives, approaches and financial, technical, and political capabilities with respect to water quality responsibilities. In many cases, agency responsibilities are administered as grant programs available to a variety of applicants, including states and/or local governments. The grant applicants must take the initiative to acquire the funding and execute the work.

The current authorization for the management plan does not provide direct funding or authority for implementing recommendations. However, there are a multitude of Federal programs (majority grant funding) available to implement recommendations. Appendix B of this report contains a Guide to Assistance for U.S. Recommendation Implementation. This Guide to Assistance for U. S. Implementation is provided to inform stakeholders of existing resources, talent, and authorities available from various federal agencies for implementation of the recommendations in the Management Plan. It also provides information on eligible applicants.

Access to the existing Federal programs/funding requires competition for national/regional funds that are based on environmental issues vs. geography. In the case of the management plan, the recommendations are diverse and may require funding from multiple Federal sources to implement in total. There is no single lead to coordinate the piecemeal implementation because the funding is administered by several agencies and different programs within the agencies, with no single agency having jurisdiction over the other relative to funding decisions. To successfully implement then, many of the management plan's recommendations will require a coordinated effort among relevant agencies and interested parties to refine the recommendations and define components to determine an implementation strategy using the available programs.

Given this perspective, the Federal government may be best positioned to take primary responsibility for Lake St. Clair watershed management issues that affect the national and binational scale, as well as supporting research, providing technical assistance and financial support to state and local entities, encouraging state and local initiatives, and representing national and binational interests in watershed discussions.

The State government may be better positioned to facilitate coordination, research, and technical assistance; to ensure the application of standards and water use regulations; to conduct evaluations of projects, and to provide financial support to local governments either through the dispersal of state funds or funds dispensed to states through federal programs.

Finally, local organizations are best positioned to take primary responsibility for planning and implementing individual projects, and in particular, facilitating citizen and stakeholder involvement.

However, absent authority, funding and directed leadership for implementation, the task of coordinating the wide array of entities responsible for Lake St. Clair, securing implementation commitments and resources, monitoring progress and assessing outcomes, all within the context of achieving local, state, federal, and binational management goals falls to existing groups and management structures.

Fortunately, efforts to coordinate shared responsibilities for Lake St. Clair are already underway at the local, regional and binational levels. At the local level, water quality boards have been established in Macomb and St. Clair counties to coordinate county water quality programs, respond to citizen concerns, and advocate for water quality improvements.

At the regional level, the Macomb and St. Clair County Water Boards have formed the Macomb-St. Clair Inter-county Watershed Management Advisory Group to collaborate on issues of common interest.

At the national and binational level, binational management for Lake St. Clair relative to the Great Lakes Water Quality Agreement is coordinated under the Four Agency Letter of Commitment, a 1998 agreement among the U.S. Environmental Protection Agency (U.S. EPA), Environment Canada, Michigan Department of Environmental Quality (MDEQ), and the Ontario Ministry of the Environment. Relative to this commitment, these agencies developed and adopted a management framework for Lake St. Clair that is intended to:

- establish a recognizable organizational body for the lake;
- provide a venue for collaboration among decision makers; and
- provide for greater representation of Lake St. Clair in larger regional priorities.

The framework builds on the existing structure under the Four Agency Letter of Commitment. The elements of the framework reflect substantial discussions with local stakeholders and governments. The framework recognizes that management responsibilities are fragmented, jurisdictional, and rest with many entities. Further, it recognizes that the implementation of watershed-based management efforts requires collaboration, coordination and communication; and should build on existing management efforts while ensuring leadership at the national and international level. In this regard, the framework also calls for a new U.S. watershed coordinating council to:

- build upon the activities of existing local groups;
- coordinate local, state and federal management activities;
- build synergy and garner support for projects;
- coordinate projects, share information and seek funding for Lake St. Clair efforts; and
- facilitate interaction among local organizations and federal, state and binational entities relative to management issues, resource needs, priorities, programs and policies.

Implementation of individual recommendations or specific elements of a recommendation will require agencies to assess their authority, capabilities, and capacities to do so. In this regard, the U.S. members of the Four Agencies have agreed to consider for adoption, those elements of the management plan most relevant to their mission and work within available agency resources and programs, and in cooperation and consultation with their Canadian partners, to achieve the vision of a healthy St. Clair River and Lake St. Clair. In addition, the USACE will respond to requests for assistance that fall within its authorities and mission areas.

On the U.S. side of the watershed, this implementation challenge can be approached initially by the establishment of a U.S. watershed coordinating council that operates under the Four Agency Framework for Management of Lake St. Clair. To this end, the

U.S. EPA and MDEQ have asked the Macomb-St. Clair Inter-county Watershed Management Advisory Group to consider serving as the nucleus of the U.S. coordinating council. However, this self-organized group would not have formal authority or resources to oversee implementation of the plan,

Management plan implementation and oversight, including the coordination of efforts relative to local, state, national and binational goals, could be simplified with the authorization of a directed program, funding, and leadership aimed at the St. Clair River and Lake St. Clair watershed. To be effective, the authorization should include the establishment and facilitation of a formal partnership, comprised of existing relevant local, state and federal agencies, that works together in an ad hoc arrangement to facilitate watershed wide collaboration across disciplines and jurisdictional boundaries, and integrate efforts aimed at achieving local, state, national and binational goals.

Ultimately, the management plan should be a living document that is adapted to meet the needs of stakeholders responsible for managing the lake. Through adaptive management and ongoing coordination, the plan provides a foundation upon which to expand existing efforts and develop new initiatives to preserve and enhance the lake's benefits. In brief, the plan must be a catalyst for continued and sustained action to maintain a healthy Lake St. Clair for current and future generations.

Achieving Our Vision
Candidate Management Plan Recommendations for Actions in the U.S. Watershed:

9-1. Establish a Lake St. Clair Partnership and develop/adopt a unified and comprehensive management structure to allow watershed-wide coordination across disciplines and to coordinate, assess, and oversee implementation efforts at all levels of government.

9-2. Establish a U.S. Lake St. Clair Coordinating Council with representation from federal, state, and local agencies with management responsibilities for the Lake St. Clair watershed to promote and coordinate implementation of the management plan, facilitate communication among stakeholders, monitor progress, and advocate for funding for management plan activities

9-3. Conduct a biennial technical and community conference within the watershed to disseminate information to the stakeholders regarding findings, conclusions, and recommendations of any completed studies or projects, and current and future implementation activities

9-4. Implement a comprehensive information-education program targeted at key target audiences to educate them about Lake St. Clair, environmental impacts to the lake, and what can be done to protect and restore the lake

9-5. Develop a central clearinghouse and watershed website to maintain an up-to-date listing of all program activities, studies, and organizations within the watershed. All organizations conducting activities in the watershed would be responsible for advising the clearinghouse of their activities